

Teacher intellectual capital. Assessment approaches

El capital intelectual del docente: enfoques de evaluación

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ABSTRACT:

The article is related to the questions over evaluation of intellectual capital. Currently, there is no unanimous opinion on the approaches to evaluation and the methods used to assess the organization's intellectual capital. Different ways of assessing the intellectual capital (intangible assets) of the organization are from domestic and foreign authors. It can be noted that there is no developed assessment of the intellectual capital of an individual employee inside of the organization, and a variety of approaches are mainly aimed at assessing the intellectual capital of the entire organization.

Keywords: d

RESUMEN:

El artículo está dedicado a temas sobre la evaluación del capital intelectual. En la actualidad, no existe una opinión unánime sobre los enfoques de la evaluación y los métodos utilizados para evaluar el capital intelectual dentro de una organización. Las diferentes formas de evaluar el capital intelectual (activos intangibles) de la organización son de autores nacionales y extranjeros. Cabe señalar que no hay una evaluación elaborada del capital intelectual de un empleado de la organización, ya que los diversos enfoques están destinados principalmente a evaluar a toda la organización.

Palabras clave: Capital intelectual, Valoración, Métodos de estimación del capital intelectual

1. Introduction

Over recent years, it can be noted that the close attention has been paid to the issues of study of an increase of the proportion of human mental functions in production and to the intellectualisation of labour (process of continuous personal enrichment, creation of intellectually meaningful experience and use of intellectual abilities). Regarding this topic, the interest to the concept of 'intellectual capital' has been permanently growing.

Now, education is considered to be the main condition for the intellectualisation of labour. Therefore, the issues of content and assessment of a teacher's intellectual capital acquire significance, specifically: what he/she possesses, what he/she can and will (what knowledge, skills and abilities) deliver to students at the present time (what intellectual capital basics will be learned by them for their future professional activities), and in future – what intellectual

capital the professional employees will have.

Intellectual activities, human knowledge, intellectual abilities and potential, intangible assets, intellectual property comprise but a small list of the terms closely related to (and sometimes replacing, being synonyms to) the concept of 'intellectual capital' (Gelbrate, 2008; Nonaka & Takeuchi, 2011).

At the present time, it may be said that in the national and foreign studies there are different approaches to the definition of intellectual capital and hence, to the definition of its structures (component elements) and methods of assessment. Because there are quite many works dedicated to the issues of intellectual capital, let us turn our attention to some of them that are of principal interest (Table 1)

Table 1
Definitions of the essence of the concept and structure
of intellectual capital in national and foreign studies

Definition	Structure (composition)
Foreign studies	
<p>Intellectual capital — total knowledge of a company's personnel who make the company competitive. This is intellectual material — knowledge, information intellectual property experience — that can be put to use to create wealth (Stewart, 2007).</p>	<p>Human capital (is what is in the heads of the company's employees).</p> <p>Structural capital (is in the company's structures).</p> <p>Customer capital (is in customers).</p> <p>Intellectual capital is created as a result of interaction of these types of capital (discussed by Stewart according to the scheme of Hubert St. Onge and Leif Edvinsson (Stewart, 2007).</p>
<p>Intellectual capital consists of the stocks and flows of knowledge, ability, skill and competencies available to an organisation (Armstrong, 2004).</p>	<p>Human capital — knowledge, skills and abilities of the employees in an organisation.</p> <p>Social capital — the stocks and flows of knowledge derived from networks of relationships within and outside the organisation.</p> <p>Organizational (structural) capital — knowledge possessed by an organisation.</p>
<p>Intellectual capital is the roots of the hidden conditions of development that lie behind the visible façade of its buildings and range of goods (Edvinsson, 1999).</p>	<p>Human capital — totality of knowledge, practical skills, creative abilities of personnel of the organisation.</p> <p>Structural capital is what enables the employees of an organisation to unlock their production potential.</p>
<p>Intellectual capital is a term for intangible assets without which the company cannot exist in the modern world (Brooking, 2001 30).</p>	<p>Market assets are intangible assets associated with market operations. Intellectual property as an asset (intellectual assets) is a property that is acquired as a result of mental activities and protected by law.</p> <p>Human-centred assets comprise collective expertise, creative and problem solving capability, leadership, and entrepreneurial and managerial skills embodied by the employees of the organisation.</p> <p>Infrastructure assets are those technologies, methodologies and processes that enable the organisation to function, they form the environment</p>

	in which the employees of the organisation operate and communicate with each other.
Intellectual capital (knowledge) is anything valued by the organisation that is embedded in people or derived from processes, systems, and the organisational culture (Bukowitz, 2002).	Individual knowledge and skills, norms and values, databases, methodologies, software, know-how, licenses, brands, and trade secrets etc.
National studies	
Intellectual capital of an entity is the value of the total intellectual assets it has, including intellectual property, its natural and acquired intellectual abilities and skills, as well as the knowledge bases accumulated by it and useful relations with other entities (Leontiev, 2002).	Intellectual property is a component of intellectual capital (it may be separated, transferred to other persons, appraised and used practically) and as well as intellectual abilities (real and potential opportunities of individuals or of the organized group of people capable to perform specific works or operations).
Intellectual capital (individual intellectual capital or personal intellectual capital) is a type of capital, including a social subject's intelligence (of a human being, group of people, organisation, society) and products of its activities i.e. new information and knowledge, those that are of social and economic value and providing it with an income (benefit) and competitive advantages (Dresvyannikov & Loseva, 2007).	Individual human intelligence that is inseparable from its medium, characterized by certain properties, development level and that is the base of the capital. Individual intellectual practices of a person that can be used in practice and that are of a certain value both for himself and for other social subjects. ('Intelligence' means the totality of cognitive and creative abilities of a social subject).

Due to a large diversity of opinions about the concept under consideration, the authors attempted to give a definition based on a detailed discussion of the concepts such as 'intelligence', 'intellectual' and 'capital' separately (Nadtochiy & Budovich, 2018): intellectual capital is the value of intangible assets (knowledge, skills, abilities, experience) created by intellectual labour [3].

Based on the studying of different opinions about the essence of this concept, a conclusion can be made that intellectual capital of the organisation is a capital that has the following characteristics:

It provides a competitive advantage to the organisation;

It provides a higher income received by the owner provided that investments are made in it;

While being created and developed, it requires more costs from the organisation and from a person;

It is being permanently accumulated (knowledge, skills, abilities, and experience);

It cannot be fully measured (hard to be measured).

2. Methodology

2.1. The essence and the structure of intellectual capital in national and foreign studies

At the present time, it is difficult to find the units of measurement of intellectual capital (though quite a number of methods of its measurement are proposed) that could precisely measure knowledge, skills, abilities, qualifications of employees, etc.

An analysis of intellectual capital assessment methods enabled to identify the most used methods in the contemporary conditions (Table 2). It is considered that now the

classification of methods for measuring intangible assets suggested by Sveiby (2010) is the fullest one. In essence, this classification is the one refined based on the classification provided by J. Lewty and M. Williams, which suggests two methods divided into four categories (groups) (Sveiby, 2010).

Table 2
Intellectual capital assessment methods

Assessment method name	Development date [4]	Author/proponent of method	Comment
Tobin's Q Ratio	1950-60s	American economist James Tobin	Ratio between a physical asset's market value and its replacement value.
Balanced Scorecard Method	1990	American economists Robert R. Kaplan and David P. Norton	The indicators are assessed by four components such as: financial, customer components, internal processes and training and development (career advancement) of personnel.
Intangible Assets Monitor	1994	Swedish economist Karl-Erik Sveiby	Method of measurement of intangible assets of the organisation in the form of a matrix in which for each component of intellectual capital such as individual competency (qualifications), internal and external structure the four indicators are defined as follows: growth, innovations/ renewal, efficiency, risk/stability.
Audit of Intellectual Capital	1996	Annie Brooking (England), expert in the issues of Hi-Tech products entry into the market	The method consists of the issues that cover the four basic components of intellectual capital (the market, intellectual, human and infrastructural assets) The smaller the number of positive answers — the lower the level of intellectual capital is.
Method of relation of the market value and the book value of the organisation	1997	American economist Thomas Stewart	It is defined as a difference between the market value and the book value of the organisation.
			The approach unites all individual (separate) indicators for the basic

Intellectual Capital Index	1997	Göran Roos, business and management specialist and Johan Roos, innovation and development expert (Sweden)	areas of intellectual capital analysis (relationship capital index, human capital index, and infrastructure and capital index) in one index. Changes of the index are due to the changes in the market assessment of the organisation.
Value Added Intellectual Coefficient	1997	Economist Ante Pulic (Pulić) (Croatia, Austria)	It defines the efficiency of use of the three basic types of resources of the organisation, and namely: added value of physical capital, added value of human capital and added value of structural capital. The sum of them is a Value Added Intellectual Coefficient. The higher such indicator — the higher the organisation's potential, its ability to create the added value is.

3. Results

3.1 Intellectual capital assessment methods

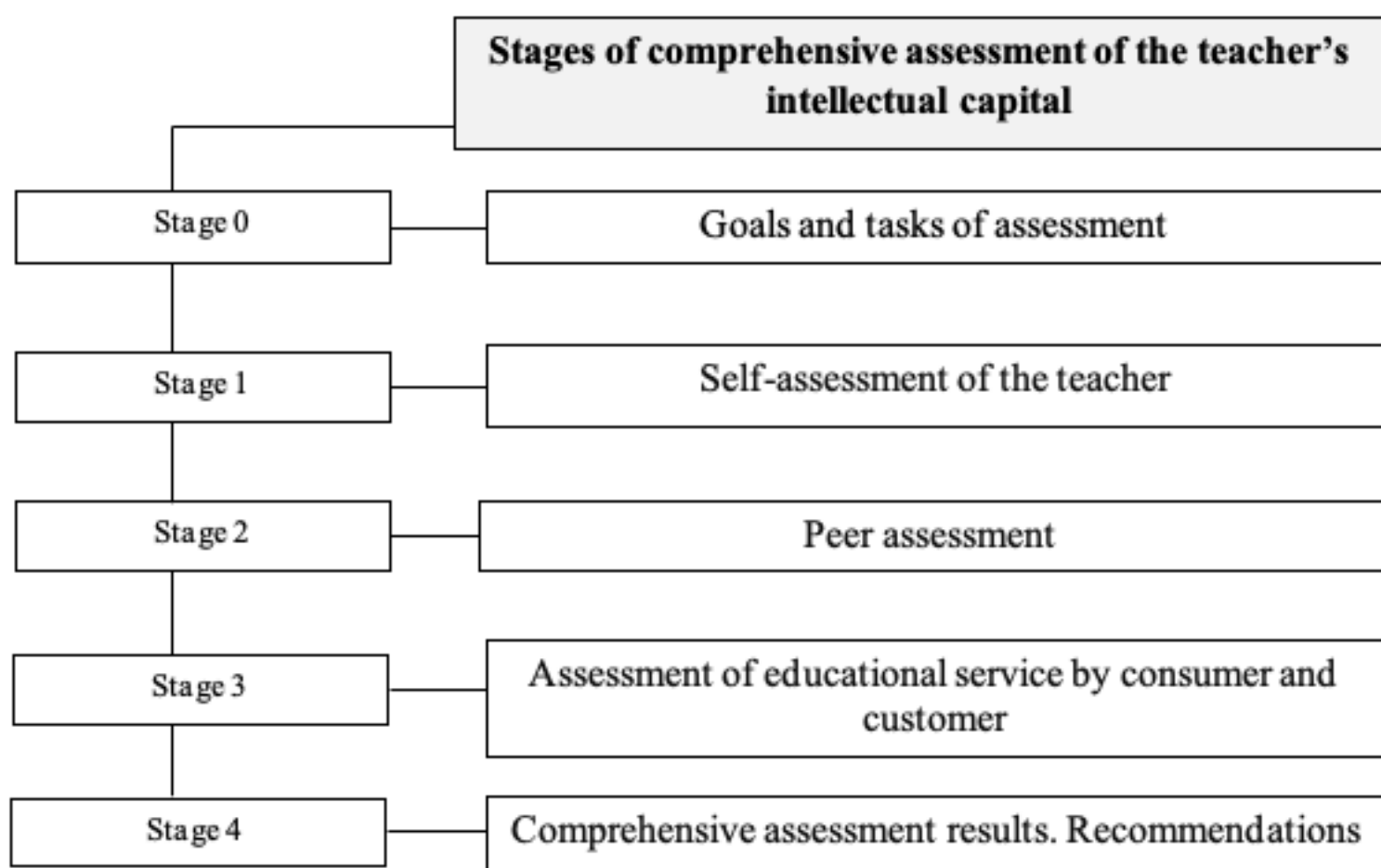
Table 2 shows that there are few developments both on the assessments of intellectual capital of an individual employee of the organisation as on the assessments of a higher education institution teacher's intellectual capital. Basically, the assessment of intellectual capital of the entire organisation is considered in different works, i.e. of all its employees collectively. It can be noted that there are studies dedicated to the assessment of individual intellectual capital from a psychological point of view (intellectual capital of perception, thinking, emotional, creative, social and cultural and economic intellectual capital are assessed).

When assessing the teacher's intellectual capital, it would be convenient to assess the components of intellectual capital part by part. Thus, the intellectual capital can be assessed using the indicators, such as:

- The staff structure of an educational institution and management of them
- Employee satisfaction
- The number of students per one teacher
- Experience in academic activities and total length of service (including the length of service for this educational institution)
- Costs for proficiency enhancement of each employee, etc.

Based on the foregoing, for the purpose of assessment of a higher education institution teacher's intellectual capital it would be reasonable to use the following scheme as displayed in Fig. 1.

Figure 1
Stages of the comprehensive assessment of a higher education institution teacher's intellectual capital.



Each stage of the comprehensive assessment (except for Stage 0) is divided into substages. Let us discuss them in more details:

Stage 0: Goals and tasks of assessment

- To define the level of satisfaction by intellectual capital
- To improve the system of motivation of intellectual labour
- To define directions of further development of intellectual capital of the teachers, etc.

Stage 1: Assessment by the teacher of his/her activities (self-assessment)

Substages:

- Assessment of gained knowledge, skills, abilities (What knowledge, skills and abilities did I acquire for the assessed period of time? E.g., when mastering new subjects, undergoing the training at upgrade training courses, developing the teaching materials, while giving classes to students etc.); it is recommended that it would be divided exactly into knowledge, skills and abilities in order to more easily spell out each item; this will facilitate a more detailed analysis
- Comparison using the 'was and become' or before and after' principle (it should be specifically indicated in each section what has changed, for example, before and after the training at the upgrade training courses: what they gave to me, what are the lessons I learnt?); the first two substages may be combined, where applicable. Comparison is very important for the teaching activities. Even if you expanded knowledge a little, found out an interesting example that you can use in your work; this means that you add something to your intellectual capital.
- Results or forecasting: will it be useful for work, how it can be used further by me? (You should definitely think this item over).

Then, based on the self-assessment, the teacher will define promising areas of further work on replenishment, development of his/her intellectual capital. A 3D Matrix is suggested for doing so (Fig. 2).

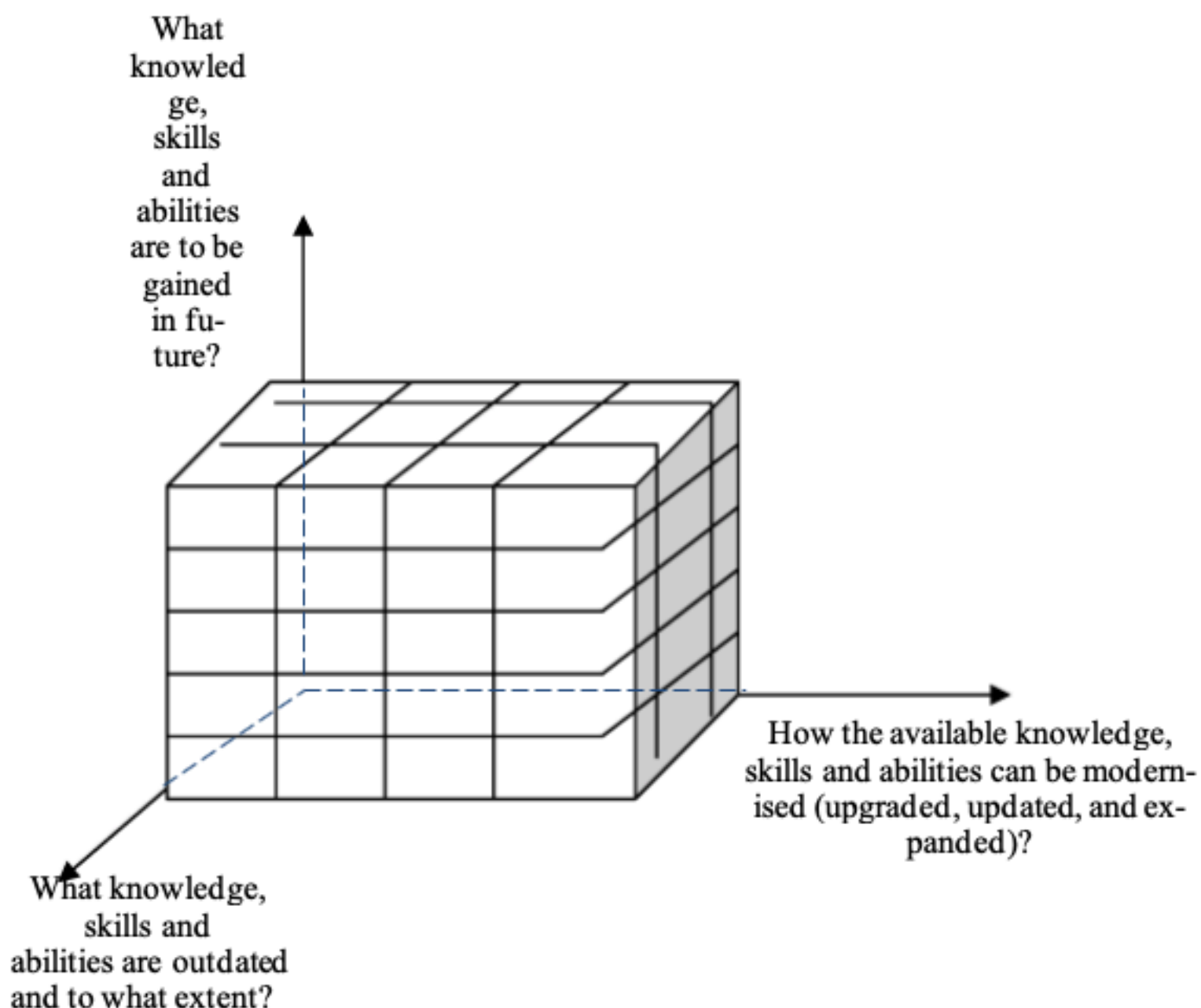
The directions for the development of the teacher's intellectual capital based on the self-assessment are depicted in the form of the 3D Matrix because this activity provides for a parallel and concurrent decision-making.

Some aspects indicated in the Matrix should be explained. In the area of modernization of knowledge, skills and abilities, it is specified that knowledge can be updated. This knowledge is not outdated completely; however, the scientific and technological progress does not stand still, it has been permanently developing. Therefore, knowledge, skills and abilities should be updated accordingly. Students often say that some teachers give them the outdated knowledge that will never be used in their future life and professional work (e.g., they teach

them how to use the old software that is not released any longer and that is used by nobody in modern companies). One can tell the students about such software just to get them familiarized with the practice of using and the history of development of the software while abandon to use it in practice. Similar with the outdated knowledge, skills and abilities that does not facilitate (and even hinder sometimes) the acquisition of the new, contemporary ones — you should abandon to use them two.

Figure 2

3D Matrix for the development of the teacher's intellectual capital



Stage 2. Peer assessment. It provides for the assessment by various experts

- Colleagues (teachers that work together with the assessed teacher)
- Representatives of the administration of the educational institution
- Invited persons (teachers from other educational organisations, etc.).

The assessment is made through the studying of the content of scientific and academic publications of the teacher, teaching materials developed by the teacher, through visiting demonstration classes, talking with the students, colleagues of the teacher and by the teacher himself/herself, reviewing students' papers assessed by this teacher and accomplished under his/her supervision (the quality of content of term papers, graduate qualification works is assessed, percentage of antiplagiarism is identified etc.), participation of students in scientific conferences, contests, Olympiads under the teacher's supervision. The representatives of the administration can pay attention to the compliance of the teacher with certain requirements: i.e. to the proficiency enhancement in a timely manner, compliance with the workload standards etc. Consequently, all the foregoing will comprise the substages of the Stage 2 assessment of the teacher's intellectual capital.

Stage 3: Assessment of the teacher by students.

At this stage, one can possibly suggest to assess the labour of the teacher by parents,

students, for example, based on the review of e-portfolio of their children published on the website of the university, or based on the face-to-face meetings with the teacher. Detailed information about the assessment of the teacher's intellectual capital by the students will be provided below.

Stage 4: Results of the comprehensive assessment and recommendations.

All results of the assessments of the previous stages are summarised, and a conclusion is made on the level and content (scope) of intellectual capital of the assessed teacher (a five-grade system can be used for all assessments). Where applicable, recommendations are given to the assessed teacher as to the areas of development of his/her intellectual capital.

A survey was conducted to study the students' opinion on their capabilities to assess the teacher's intellectual capital. 103 students (1st to 4th year students) of the Moscow Technological University that attend classes in the following fields of study: "Innovation Theory", "Management", "Optical Engineering" and "Biotechnical Systems and Technologies" (Bachelor Degree Course, intramural form of study) participated in that survey. The respondents were asked the following questions: By which criteria and indicators can you personally assess the teacher's intellectual capital? By which criteria and indicators could your parents assess the teacher's intellectual capital?

Because no significant differences have been identified in the opinions of the students of different years, we will provide the general results of the survey (Figures 3, 4 and 5).

The majority of the respondents to the survey (65%) consider that they can assess the teacher's intellectual capital by how he/she gives classes (lectures, hands-on and laboratory classes etc.), prefer the classes with interesting material, interesting practical assignments, and value a possibility of 'live' communication with the teacher based on the respect for the students. Concurrently, this motivates the students for learning activities. In the course of the earlier conducted survey (Zerniy & Nadtochiy, 2016) it had been identified that students basically believed that an interesting, relevant material and the accomplishment of practical assignments was the motivation needed for them to attend classes in the educational institution.

In the course of personal talks, many of them voiced an opinion that academic credentials, academic status, title of the teacher are not important and not interesting for the students, they pay no attention to these (and many of them have no idea which title, rank or status is higher).

The survey results show that basically the diversity of opinions is wide. The students often suggested that the teacher's intellectual capital would be assessed based on their own vision of an ideal teacher: some of them pay attention to the teacher's age (prefers young teachers), the others — to the sense of humour (if teacher can joke, defuse the situation with a joke during the classes). They suggested that the teacher's work experience in a different sphere of activities not only in the scientific and teaching area would be considered.

Figure 3

Students' opinion on how they can assess the teacher's intellectual capital
(in % of the total number of respondents).

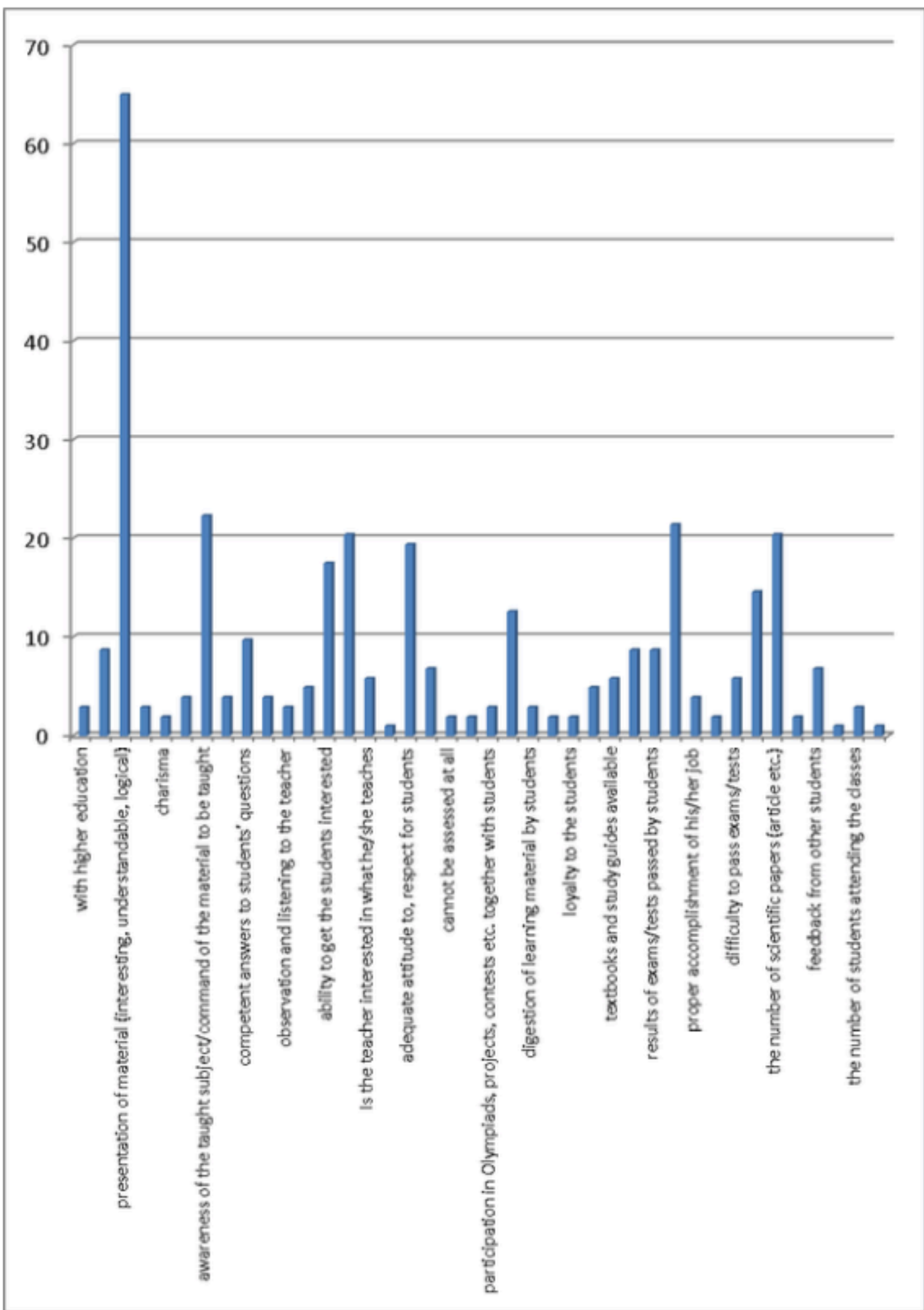


Figure 4

Most popular answers to the questions about the assessment of the teacher's intellectual capital by the students, in % of the total number of respondents (answers are arranged in descending order)

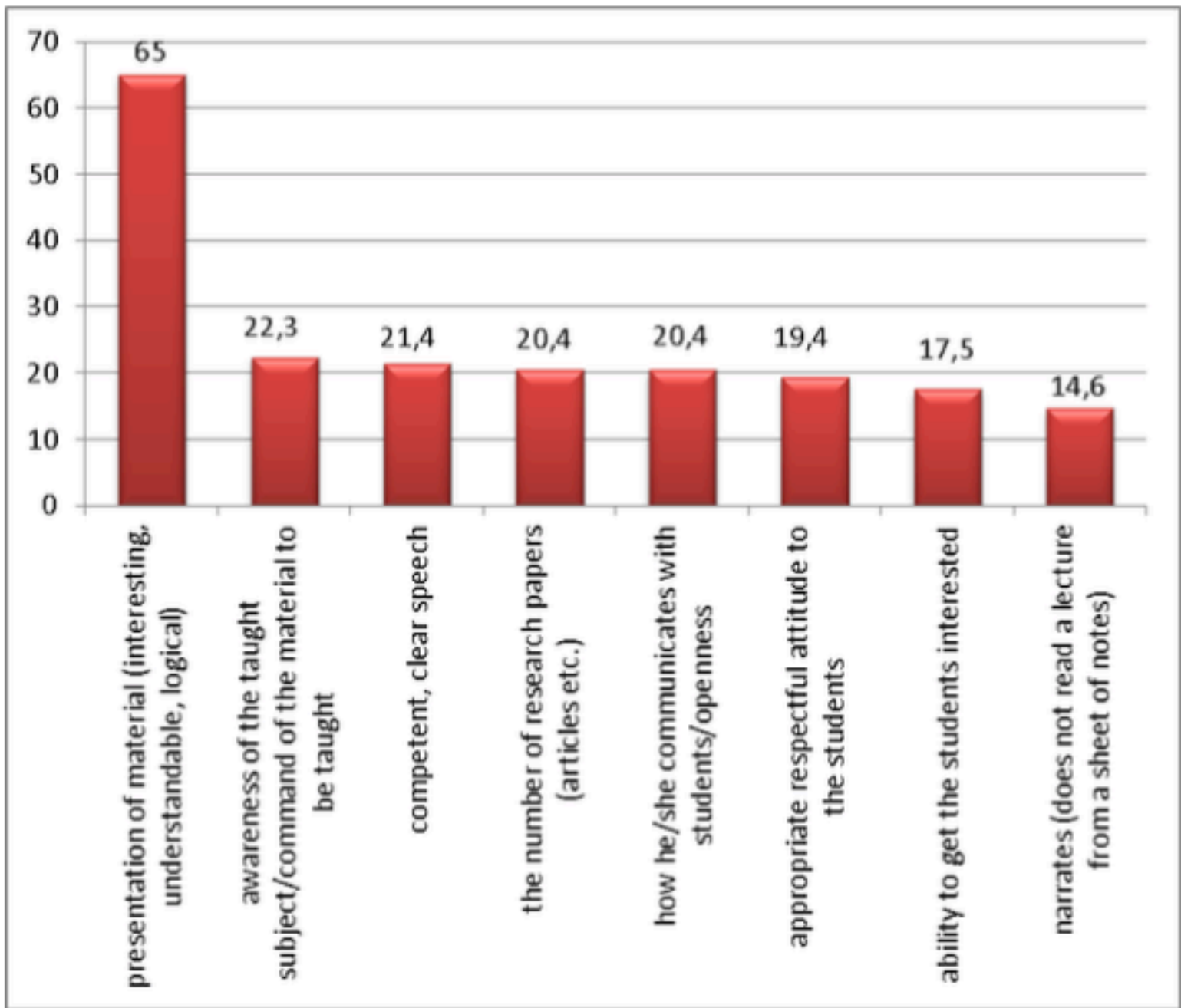
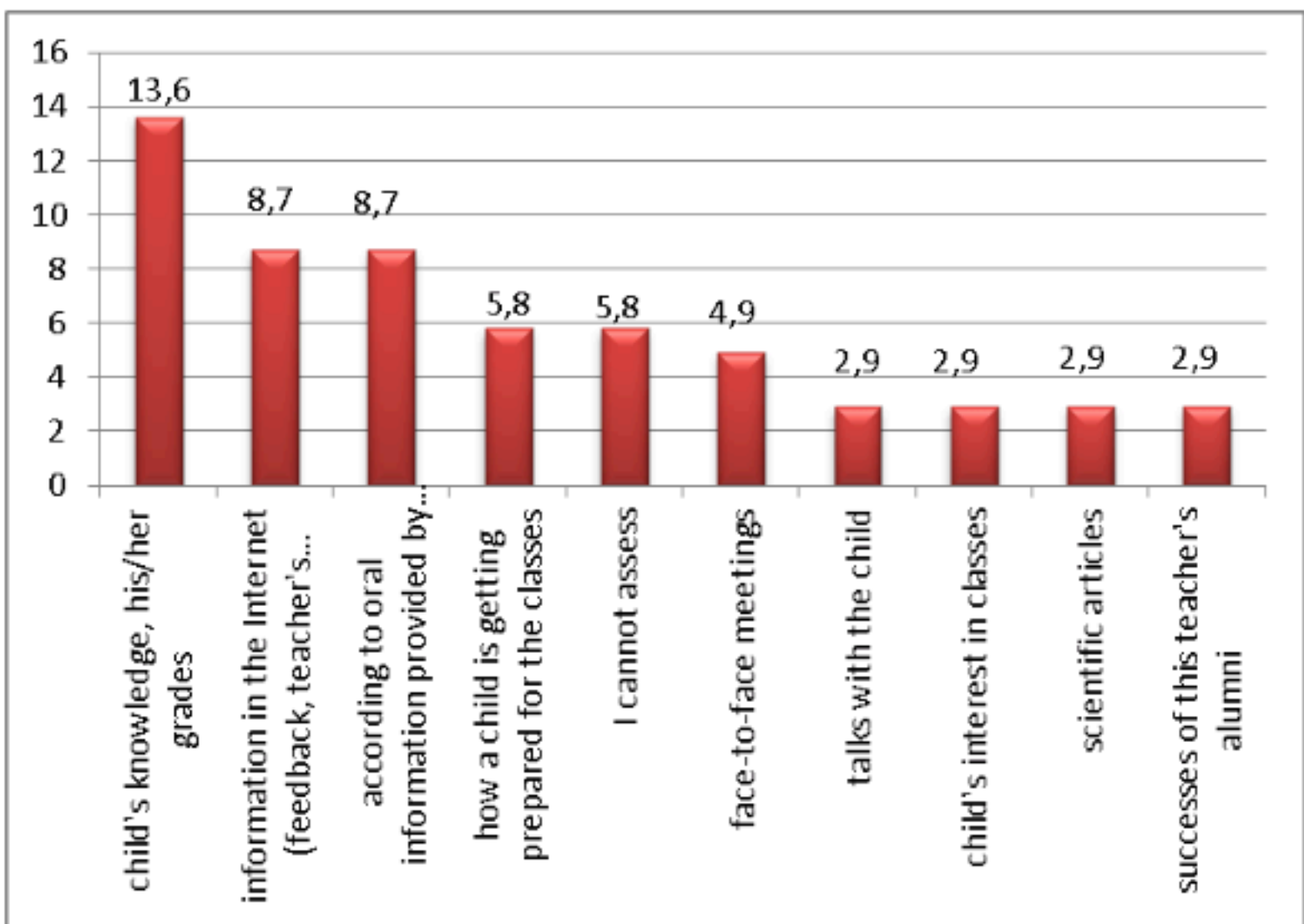


Figure 5

Students' opinion on how their parents can assess the teacher's intellectual capital, in % of the total number of respondents (answers are arranged in descending order)



An opinion was expressed that in the assessment of intellectual capital, the parents are hindered by the so-called old-fashioned education as compared to the modern one received by their children. And if the assessment is made by a 'stupid four-letter man' it would be difficult for him or her to appreciate a smart person; therefore, a factor of who will assess intellectual capital is to be taken into consideration. There is an expression that "assessment will be possible provided that initially adequate students are available".

There are some interesting papers in which the most specific criteria and indicators of the assessment of the teacher's intellectual capital by the students are suggested. E.g., there are suggestions to assess in the form of a questionnaire with open questions, such as: Do you believe that the teacher is prepared for the classes correctly? Does he explain the topic being studied in layman's terms? Were there any moments when you did not understand the explained material? Please, give examples, etc.

There is a suggestion to assess using following parameters:

- Ability to explain material in plain language (without reading from a sheet, using presentations etc.)
- Quantity and quality of the teacher's research paper
- Education and experience
- Ability to quickly switch from one information to another in the course of discussion
- Capability to give historical references, examples from life
- Personal communication with the teacher (his/her personal qualities)
- Teacher's interests and hobbies at leisure.

The criteria for assessment of the teacher's intellectual capital are considered, such as: the number of published articles; salary; and ability to present material in layman's terms; job title; and *even* an opportunity to find a better job.

Some of them suggested that personal and professional qualities of the teacher such as competency, comprehensive knowledge, talent (dedication to the subject) and aptitude, talent to teach (ability to present material, ability and wish to communicate with the students, and win authority) would be assessed.

There were suggestions to assess how the teacher uses his/her personal knowledge and experience and whether he/she is able to share such capital with others, which is the key criterion for assessment of the teacher's intellectual capital.

Among the opinions, there are single statements, such as: to check how the teacher will act in relation to the students in emergency; the teacher must professionally prepare a lesson plan, make humorous breaks; whether the information presented in the classes is really useful, frequency of situations associated with the necessity to use such information by the teacher, tidy appearance, punctuality, ability to remember names and faces of students, as well as to know their individual features (which is indicative of the teacher's high intellectual capital).

However, basically, the respondents' opinions reduce themselves to the fact that assessment of the teacher's intellectual capital is a qualitative and a very biased assessment rather than a quantitative one.

In most cases, the students assess the teacher's intellectual capital using a 'bad/good teacher' scale, fully equalling intellectual capital with personal qualities of the teacher. It is obvious that interrelation of intellectual capital with the personal qualities of their owner (the teacher in our case) can be observed; however, these concepts are not equal.

In the national studies of the essence of intellectual capital, there is an opinion about the connection of intelligence and any intellectual activity with moral values of a person. Such connection facilitates a creative rather than devastating human effect on the surrounding world. The moral (spiritual) values such as integrity, reliability, mutual assistance etc. are also highlighted.

Based on the obtained data, a conclusion can be made that at Stage 3 (assessment of intellectual capital by consumers and by customers) a scorecard using a five-point grading scale must be provided to the students to assess the teacher's intellectual capital. The following assessment items are to be enumerated in such scorecard, for instance:

1-For the classes (lecture and practical classes): content of the class, comprehensibility of presentation of material, level of answers to the questions, use of teaching innovations, use of feedback, competent speech, use of illustrative examples, modern cases, equipment, etc.

2-For testing activities (examination, pass-fail exam, presentation of a term paper etc.): complexity of examination on a subject, the questions for the preparation comply with the material presented during lectures and practical classes, consultations for the students, etc.

The same scorecard can be suggested to be completed by parents provided that they visited a teachers' open class training and that face-to-face meetings with the teacher were arranged.

The customer capital is also assessed in terms of commitment of consumers (customers) to your organisation and no interest to competitors, and can be measured in terms of consumer satisfaction and associated with the improvement of financial indicators of the organisation (Stewart, 2007). For higher education institution, this can manifest itself in the number of applicants that enter it relying on positive feedback from students. This is confirmed by results of another survey of the students (Zerniy & Nadtochiy, 2016): recommendations from relatives and friends who study or studied in this university are specified by the students as the main reason for selecting the educational institution.

Based on the foregoing, the authors propose criteria and indicators for the assessment of intellectual capital of a higher education institution.

A set of indicators for the assessment of intellectual capital of the higher education institution is the assessment of three components of intellectual capital: human capital, organizational capital and communicative (relationship) capital.

1. Human capital is the main element of intellectual capital. In this case, the assessment criteria may be as follows: attractiveness of the educational institution, as well as effectiveness of the higher-education teaching personnel. In this case, the indicators of assessment of intellectual capital of the higher education institution are as follows: the number and the percentage of the bachelors who select to continue to study the master's

degree programme at this educational institution; the number and the percentage of the masters who select to continue postgraduate education at this educational institution; the number and the percentage of the students engaged in scientific activities at this educational institution; number of teachers and academic researchers; the number and the percentage of the students who have complaints; the number of alumni, the number and the percentage of the teachers and academic researchers who know foreign languages and information technologies, etc.

2. Organizational capital. In this case, the assessment criteria may be as follows: level of innovative and scientific development of the educational institution, as well as the level of development of educational activities. In this case, the indicators of assessment of intellectual capital of the higher education institution are as follows: the number of implemented research and development works; the number of proprietary scientific publications of the educational institution; the number of educational programmes; percentage of educational programmes implemented jointly with employees; the number of registered contracts for intellectual property; the number of patents for intellectual property items, etc.

3. Communicative capital. In this case, the assessment criteria may be as follows: dynamics of formation of an educational institution brand, as well as dynamics of expansion of external relations. This time, the indicators of assessment of intellectual capital of the higher education institution are as follows: the number of charity events with the participation of representatives of the educational institution; the number of joint scientific studies; the number of international scientific events with the participation of scientists of the educational institution; the number of received international and Russian grants; the number of partner companies participating in the educational and research processes; the number of foreign teachers who give classes at the educational institution, etc.

Assessment of intellectual capital of the higher education institution facilitates the identification of the areas that require adjustment of the management system; this will result in the improvement of the system of management of the educational institution as a whole. The modernisation may be connected with innovative activities, publication activity of students and the higher-education teaching personnel, conduct of scientific studies and commercialisation of results of intellectual activities. The work in this area also provides for the improvement of the learning and teaching process in relation to the programmes, standards, educational technologies, and training support systems.

After the completion of the assessment of intellectual capital of the educational institution, it would be reasonable to define the key areas of development of the higher education institution's activities:

- 1) Improvement of the competitiveness of the educational institution in the education market
- 2) Improvement of prestige of the educational institution in general, facilitating the attraction and retention of a larger number of students with high potential
- 3) Improvement of efficiency of the higher-education teaching personnel
- 4) Innovative development of the higher education institution
- 5) Scientific development of the educational institution
- 6) Successful development of education activities
- 7) Formation of the brand of the educational institution and promotion of it in the education market, as well as expansion of external relations and international cooperation.

4. Conclusions

Summarizing the foregoing, it should be noted that it is very difficult to univocally consider the concept of intellectual capital as well as to suggest uniform methods for the assessment thereof due to the specificity of activities of different organisations. Therefore, there are various concepts of intellectual capital that will be further developed; and the methods for the assessment thereof will be improved.

There are many reasons for the assessment of a teacher's intellectual capital; continuous education quality improvement is one of these reasons.

In the conclusion, it can be said that maintaining a high level of satisfaction with the quality of education and research and development activities of consumers, partners etc. facilitates the improvement of the entire education system, in general.

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3. Intellectual labour is the work in the performance of which the working body that creates a product is the brain; mental energy consumption prevails; the product of labour is a thought (idea) presented on paper, to be transferred to others or materialized in something (on a canvas, emmarbled, know-how etc.). Intellectual labour is of a creative nature to a large extent [Dictionary of Economics, 2017, p. 266].

4. *Note:* an approximate data of development of the method is specified because:

- 1) The development of the method could take a certain period of time;
 - 2) There is a certain time period between the development of the method publication of results (representation thereof);
 - 3) The authors themselves often fail to specify exact dates of the development of the method in their works;
 - 4) Some of the existing methods are continuously refined/ clarified/ added by the authors in response to the requirements of current situation.
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